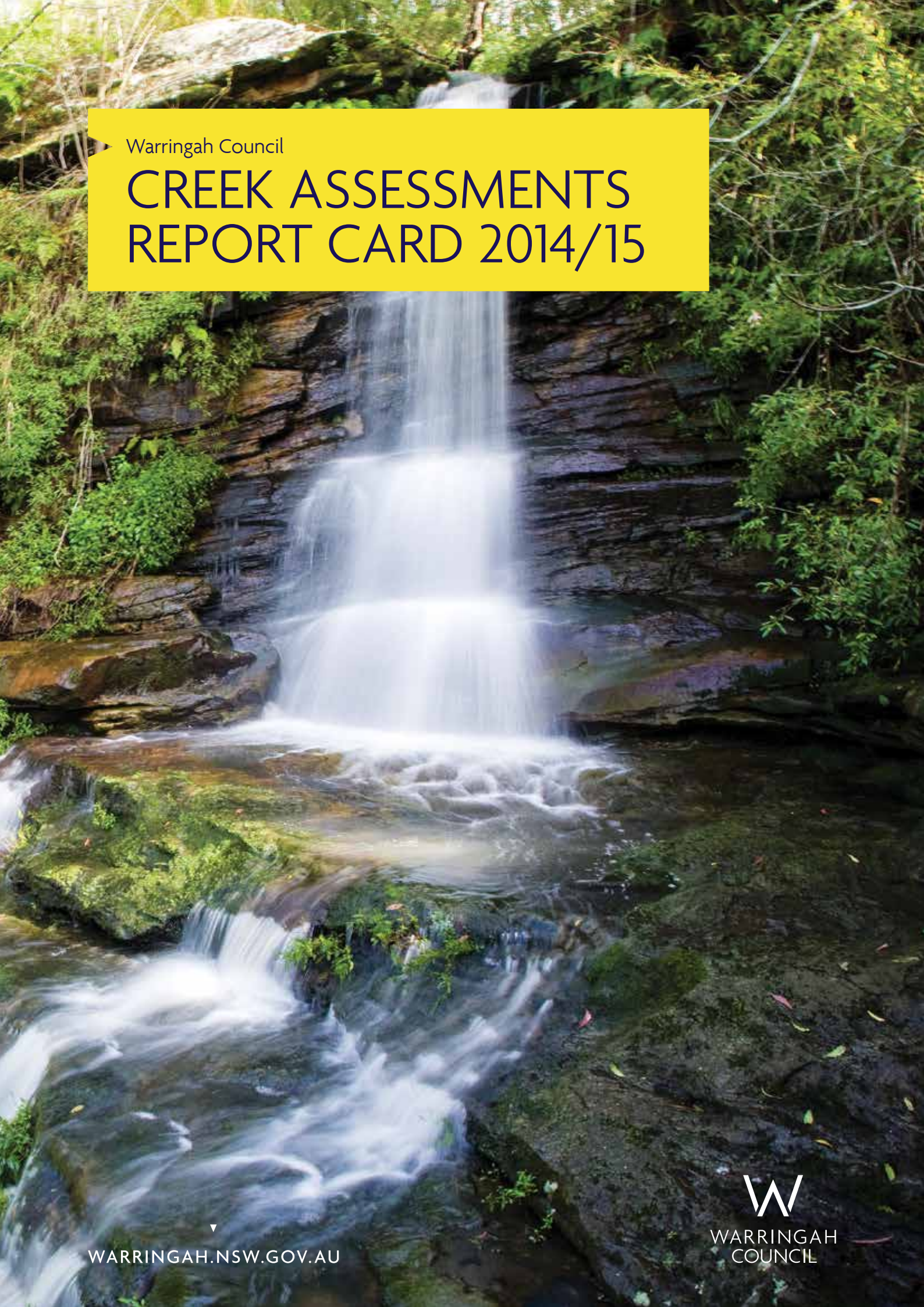


Warringah Council

CREEK ASSESSMENTS REPORT CARD 2014/15

WARRINGAH.NSW.GOV.AU

WARRINGAH COUNCIL

Contents

Manly Dam catchment, Allambie Heights
Photograph: Ben Fallowfield

KEY MESSAGE 2014/15

It is important to monitor the health of our creeks as they are directly connected to our lagoons, influencing their ecological condition and ultimately emptying into the sea. The quality of water in our creeks is is influenced by the activities that are taking place within the wider catchment. Pollution, sediment inputs and weed invasion all affect the overall health of creeks in Warringah.

On the whole the condition of Warringah streams is favourable, however, there appears to be a trend towards poor quality streams in the most urban and residential areas. Water quality in particular was mostly found to be good, however, a number of the streams monitored as part of this survey were recorded as having particularly high nutrient levels. It is important to consider this in future management activities as elevated nutrients can have cascading effects that influence all aspects of stream health.

We are lucky to have such natural assets in Warringah and it is important for us to think of ways in which we can help to preserve these. Everyone can contribute in some way, from being mindful of how we dispose of rubbish, to thinking about the species of plants we grow in our garden and the cleaning products we use in and around our houses. If everyone shares the responsibility of caring for their surroundings we can expect Warringah creeks to be healthy for future generations.

OVERVIEW

Warringah Council, in partnership with the NSW Office of Environment and Heritage (OEH) have commenced an integrated creek health monitoring program, the first of its kind in NSW. The aim is to assess the ecological condition of Warringah creeks and identify any changes in condition over time.

This Report Card provides an overview of creek condition of 21 sites across the Warringah Local Government Area (LGA) for 2014/15.

There are four main aspects of creek monitoring that provide a good indication of the condition of a creek and its catchment.

These include:

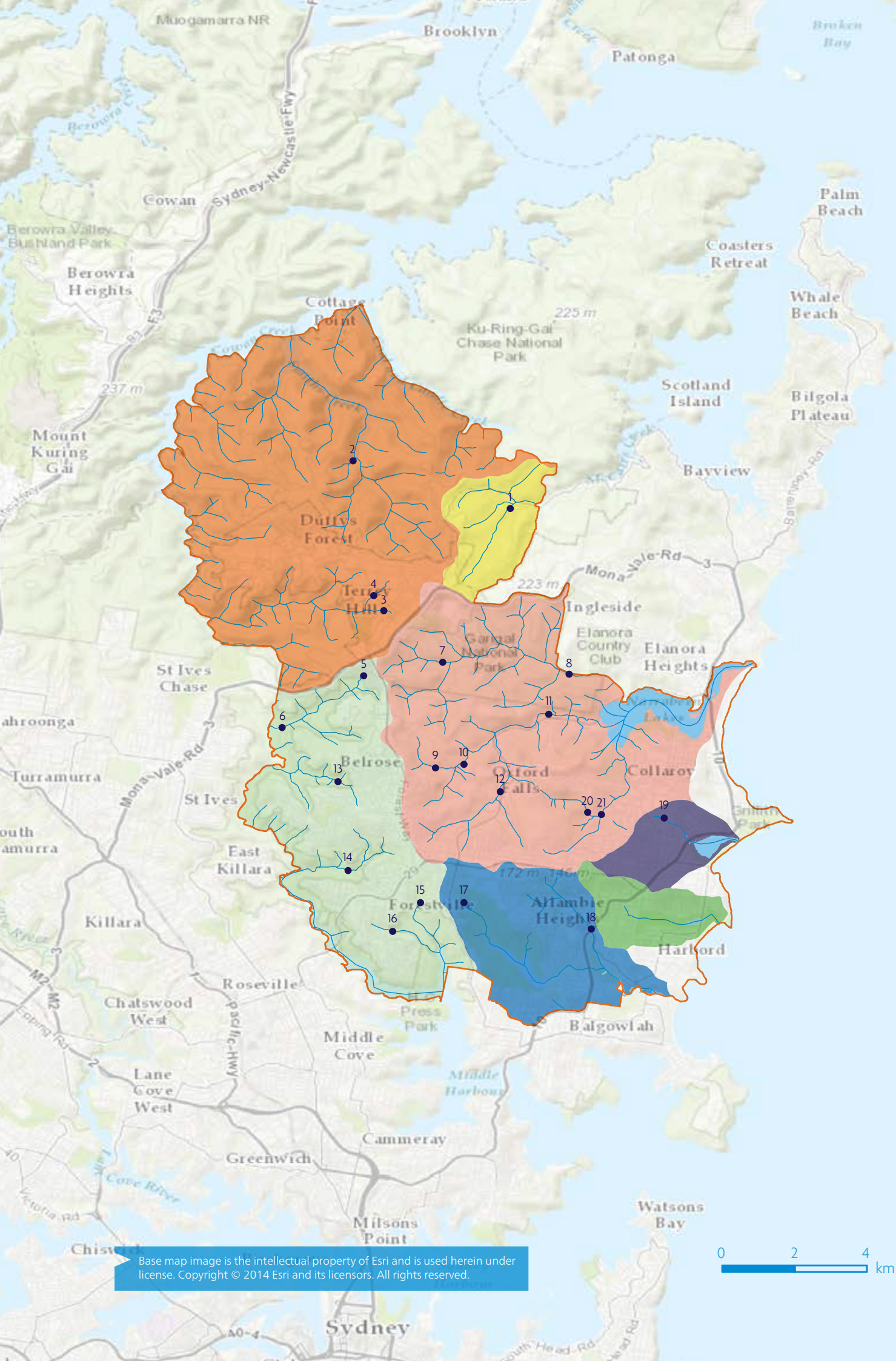
- testing water quality
- observing the macroinvertebrate (bug) communities
- assessing the condition, structure and diversity of riparian vegetation and
- evaluating the reach condition (i.e. the condition of the stretch of creek as a whole).

Testing water samples for things like nutrients, chlorophyll *a* and turbidity provide a snapshot of water quality at the time of sampling. By looking at the bugs that are found in the creek, a more long term picture of the condition of the creek can be obtained.

Samples were collected twice at each creek, in spring 2014 and autumn 2015. These data were used to calculate four condition indicators for each creek encompassing water quality, macroinvertebrate community, riparian habitat quality and reach condition.

site

01. McCarrs Creek
02. Smiths Creek
03. Kierans Creek
04. Neverfail Creek
05. Bare Creek tributary
06. Bare Creek Ralston Ave
07. Deep Creek upstream
08. Deep Creek Narrabeen
09. Snake Creek
10. Oxford Creek
11. Middle Creek downstream
12. Middle Creek above falls
13. Frenchs Creek
14. Carroll Creek
15. Bantry Bay 1
16. Bantry Bay 2
17. Curl Curl Creek
18. Brookvale Creek
19. Dee Why Creek
20. Wheeler Creek
21. South Creek



THE CREEK CONDITION GRADES EXPLAINED

WATER QUALITY

Measuring the water quality of a creek gives us an idea of the condition that it is in, and helps to identify any contaminants or extra sediment that might be washing in as a result of human activity. To evaluate water quality we take measurements in the field and also collect water samples that are analysed back in the laboratory for nutrients, chlorophyll *a* and turbidity.

The condition of the creeks in the Warringah catchment are assessed by looking at the levels of these different water quality parameters and comparing them to published guidelines (ANZECC*). We use the amount by which these guidelines are exceeded to gain an understanding of the condition the creek is in and to what extent the creek is threatened by pollution. Some of the measures used in this study are discussed below:

Nutrients

Measuring nutrients is an important aspect of a monitoring program. Nutrients are substances that are essential to the growth of living organisms. Nutrients occur naturally, however, when extra nutrients wash into the system it can cause weeds and microalgae to grow out of control (algal blooms). This can cause serious problems for the environment. For example significant algal blooms restrict the amount of light available for plant growth. Additionally, when these organisms die they are broken down by oxygen consuming bacteria, depleting the oxygen levels in the water which can kill aquatic wildlife.

OEH scientist collecting water samples from Snake Creek

Chlorophyll *a*

Chlorophyll *a* is a green pigment found in plants, giving them their characteristic green colour. Its function is to absorb sunlight which it essentially converts into sugar during a process called photosynthesis. Chlorophyll *a* is contained in chloroplasts which are specialised compartments within plant cells that can be found in microalgae and phytoplankton.

Chlorophyll *a* is therefore a good indicator of the amount of microalgae or phytoplankton in the water, which reproduce in response to unnaturally high levels of nutrients that can be washed into creeks and streams.

Turbidity

Turbidity is a measure of how clear the water is. It is related to the amount of material that is suspended in the water including algae. High levels of turbidity can restrict the amount of light that is available for plant growth and can damage small aquatic organisms.

EXCELLENT	On average, the water quality indicators are below the ANZECC guidelines for lowland coastal rivers in south-east NSW
VERY GOOD	On average, the water quality indicators exceed ANZECC guidelines but by < 25% of the trigger value
FAIR	On average, the water quality indicators exceed ANZECC guidelines by 26 - 50% of the trigger value
POOR	On average, the water quality indicators for the site exceed ANZECC guidelines by 51 - 75% of the trigger value
VERY POOR	On average the water quality indicators exceed ANZECC guidelines by >75% of the trigger value

*In 2000 the Australian and New Zealand Environment Conservation Council (ANZECC) published the Australian and New Zealand guidelines for fresh and marine water quality. These guidelines provide a framework for conserving ambient water quality. In essence it provides guideline trigger values against which monitoring data can be compared.

THE CREEK CONDITION GRADES EXPLAINED

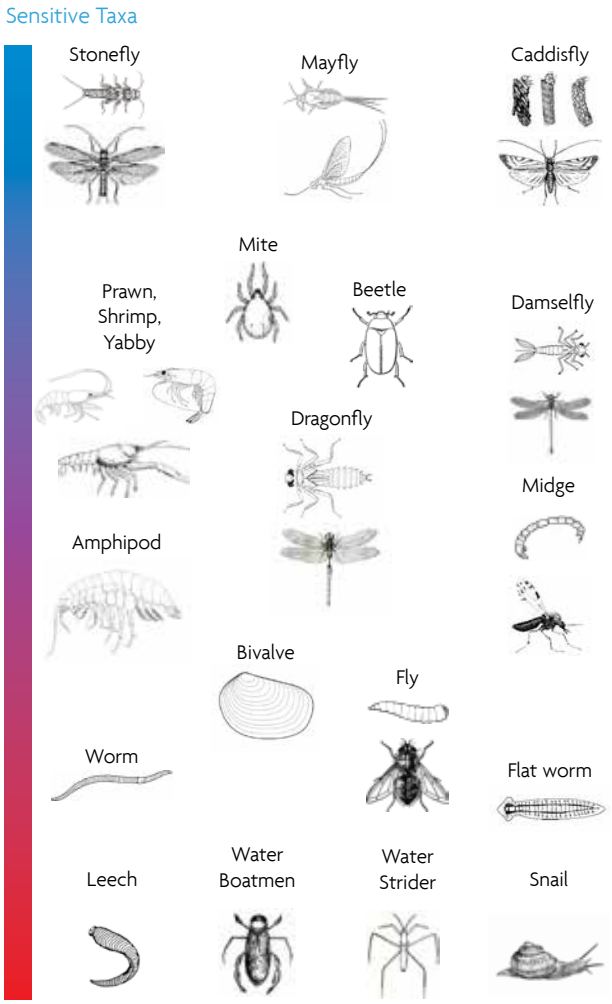
BUGS / MACROINVERTEBRATES

While taking water quality samples can be an informative way of assessing the condition of a creek, it only provides information from a snapshot in time. Pollution events that may have occurred in the past are not picked up by collection of water samples alone. By looking at the macroinvertebrates (bugs) that are present in a creek we can get an indication of past as well as present conditions.

Most of the bugs that live in creeks have life cycles that can last from a few weeks up to a whole year or more. Documenting the bugs that exist in a particular section of creek can tell us a lot about the longer term condition in the upstream habitat.

This is based on our knowledge of the tolerance of different families of bugs to pollution. Some families are extremely sensitive to pollution and so their presence in a creek is a good indication that it is in a favourable condition. Other families of bugs are a lot more tolerant to pollution and so the presence of these groups in the absence of more sensitive types can indicate a more long term impact is taking place in the creek.

One of the ways we use the presence of bugs to assess creek condition is with the Australian River Assessment System (AusRivAS). This system uses a nationwide database made up of creeks from a variety of different environmental conditions (e.g. geographic location, altitude, width) of both good and bad quality. We compare the bugs that are present in a creek with the bugs that are expected to be present in the creek by referring to this database. This process produces a grade that gives an idea of the health of the bug community within the creek based on how well it compares to the best quality sites in NSW. An explanation of these different grades is outlined by the colour symbols on the previous and following pages.



EXCELLENT
More bug groups collected than expected to be present

VERY GOOD
Number of bug groups collected is similar to those expected to be present

FAIR
Number of bug groups collected is less than those expected to be present

POOR
Number of bug groups collected is significantly less than those expected to be present

VERY POOR
Very few of the expected bug groups collected

For more information contact:
Natural Environment Unit
Warringah Council

Estuaries and Catchments Team
NSW OEH

THE CREEK CONDITION GRADES EXPLAINED

RIPARIAN HABITAT

Riparian habitat is the land and vegetation adjacent to the creek. They support high levels of biodiversity and they are critical in controlling flows of nutrients between the land and water. To get an overall understanding of the condition of a creek and its catchment, it is important to consider riparian condition in addition to considering the water quality and bugs.

The evaluation of riparian vegetation assesses canopy, under storey and ground cover for some of the following values:

- Width of vegetation
- Dominance of native versus exotic species
- How close to nearest patch of native vegetation.

EXCELLENT

Sites that have a riparian score over 80% of the total possible score are rated in this category

VERY GOOD

Sites that have a riparian score of between 61 and 80% of the total possible score are rated in this category.

FAIR

Sites that have a riparian score of between 41 and 60% of the total possible score are rated in this category

POOR

Sites that have a riparian score of between 21 and 40% of the total possible score are rated in this category

VERY POOR

Sites that have a riparian score of between 0 and 20% of the total possible score are rated in this category

REACH CONDITION

The length immediately upstream and downstream of the sampling site is defined as the reach.

This section of each creek was assessed for:

- Naturalness - the degree to which the current state compares to its natural state
- Representativeness - whether the creek is a good example of a natural system compared with other creeks in the area
- Diversity - the diversity of observed natural plant species and observed animal species
- Rarity - how rare or unusual features of the creek are relative to other creek in the area
- Special features - whether the stream has any significant features or processes

Each creek is assigned a score for each of these descriptors and the overall average taken. This average is then converted into a reach condition grade for each creek.

EXCELLENT

Sites that have a stream reach assessment score of over 80% of the total possible score are rated in this category

VERY GOOD

Sites that have a stream reach assessment score between 61 and 80% of the total possible score are rated in this category

FAIR

Sites that have a stream reach assessment score between 41 and 60% of the total possible score are rated in this category

POOR

Sites that have a stream reach assessment score between 21 and 40% of the total possible score are rated in this category

VERY POOR

Sites that have a stream reach assessment score between 0 and 20% of the total possible score are rated in this category

Allenby Park Brookvale
Photograph: Ben Fallowfield

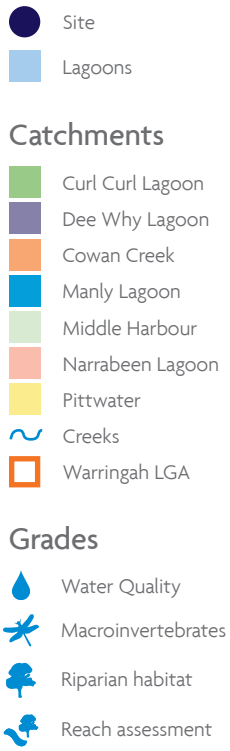
RESULTS

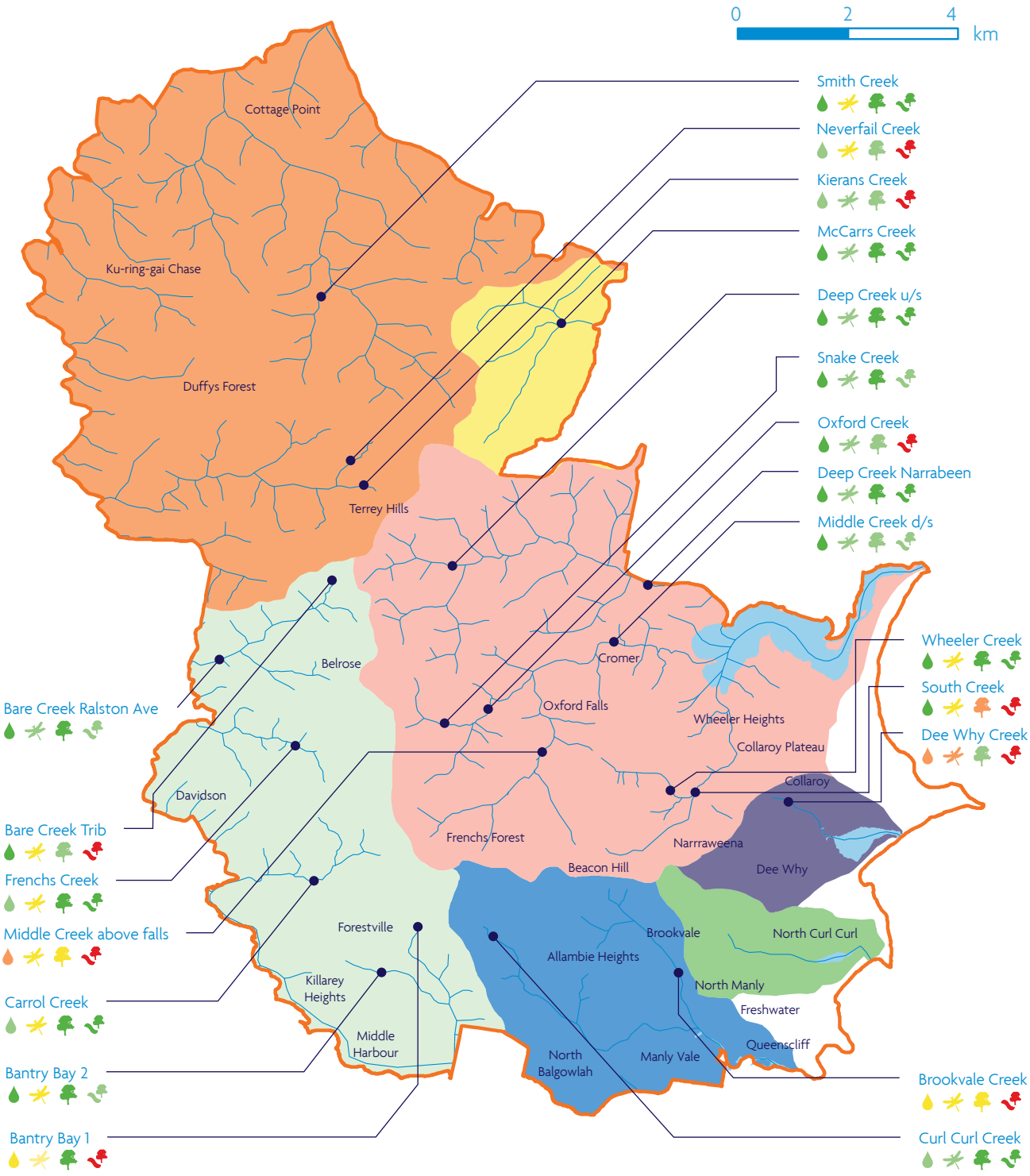
Waterways including McCarrs, Snake, Oxford, Middle (downstream), Deep, Curl Curl, Bare, Wheeler and Smiths Creeks are generally in excellent condition. This is directly related to the limited development and hard surfaces, such as roads, roofs and pathways, within their catchments. This means there is less stormwater entering the creeks, and carrying less pollution, compared to other catchments with more intense land uses.

Creeks in an average condition include Kierans, Neverfail, Middle (above falls), Frenchs, Carrol and Bantry Bay Creek which all have moderate levels of development and hard surfaces with their catchments.

However, creeks including Brookvale, Dee Why, South Creek and a tributary of Bare Creek are generally in poor condition. This correlates with the high density of development within the catchment including residential, industrial and commercial land uses and their associated hard surfaces.

It is important to note that these results are only reflective of the section of creek where the assessment was undertaken and may not necessarily reflect the condition of the entire creek.




0
2
4
km
Smith Creek
Neverfail Creek
Kierans Creek
McCarrs Creek
Deep Creek u/s
Snake Creek
Oxford Creek
Deep Creek Narrabeen
Middle Creek d/s
Wheeler Creek
South Creek
Dee Why Creek
Brookvale Creek
Curl Curl Creek
Bare Creek Ralston Ave
Bare Creek Trib
Frenchs Creek
Middle Creek above falls
Carrol Creek
Bantry Bay 2
Bantry Bay 1
Cottage Point
Ku-ring-gai Chase
Duffys Forest
Terrey Hills
Belrose
Davidson
Cromer
Oxford Falls
Wheeler Heights
Collaroy Plateau
Collaroy
Frenchs Forest
Narrraweena
Beacon Hill
Dee Why
Forestville
Killarey Heights
Middle Harbour
Brookvale
North Curl Curl
Allambie Heights
North Manly
Freshwater
Queenscliff
North Balgowlah
Manly Vale

MANAGEMENT ACTIONS

HOW CAN I HELP IMPROVE CREEK HEALTH IN MY COMMUNITY

- Report pollution events to Council on 9942 2111
- Join a bushcare group - find out from Council how you can get involved to help reduce the number of exotic and invasive plants, particularly in urban areas
- Sweep your gutter and driveway regularly and place the sweepings on the garden, in the compost or rubbish/vegetation bin to avoid it being washed down the drain and into our creeks.
- Plant native species in your garden and avoid invasive weeds
- Avoid unnecessary use of fertiliser on your property. Fertilisers are easily washed into creeks and result in elevated levels of nutrients which can have a number of knock on effects
- Avoid large-scale clearing of vegetation and stabilise by replanting areas of disturbed soil. This will help prevent erosion of creek banks and reduce sediment and nutrient entering into streams
- Try and use ecofriendly cleaning products that are free from phosphates
- Ensure only rain water goes down the stormwater drain. Wash paint brushes in the sink.

Invasion of riparian habitat by weeds at Dee Why Creek.
Photo: Ben Fallowfield

Clearing can result in increased sediment inputs increasing turbidity.
Photo: OEH

Algal growth at Dee Why Creek resulting from elevated levels of nutrients.
Photo: OEH

- Wash cars on the lawn and minimise detergent use. Empty the soapy water down the sink or toilet. Even better, take the car to a car wash where the water gets treated and recycled
- Install a rainwater tank to water your garden, flush your toilets or connect to your washing machine
- Clean up pet droppings and dispose of them in the rubbish bin or in the toilet
- Consider natural alternatives to pest control chemicals in the garden
- Make sure your household sewerage pipes are not connected to stormwater
- Replace impermeable surfaces (e.g. concrete) with permeable surfaces such as timber decks and pavers (with gaps between pavers) to allow rainwater to infiltrate into the ground
- Maintain your car, making sure there are no oil leaks
- Pick up litter and be mindful of how you dispose of your rubbish and where it ends up.
- Report any invasive plants that you notice while out walking

Rubbish at Brookvale Creek
Photo: OEH

Gross Pollution Trap at Bantry Bay 1.
Photo: OEH

Debris collects around a trolley dumped at South Creek.
Photo: OEH

Allenby Park, Brookvale
Photograph: Ben Fallowfield